TABLE 2.—*Incidence of Psychogenic Rheumatism*

		Psychogenic Rheumatism	Organic Change plus Psychogenic Overlay	Total Cases with Psychogenic Symptoms
Peripheral Joint Complaints	214	44 (20.6%)	8 (3.7%)	52 (24.3%)
Back Complaints	136	26 (19.1%)	36 (26.5%)	62 (45.6%)
Total Number of Cases	350	70 (20.8%)	44 (12.6%)	114 (32.6%)

When the conversion is pure and none of the well-known psychoneurotic symptoms accompany the fixation, recognition of the underlying emotional maladjustment may be difficult. Experience has taught most of us to be suspicious of striking incongruities between the subjective complaints and the organic findings. Bizarre symptoms or signs are much more likely to be functional in nature than they are to be unusual manifestations of a rare disease. The experienced medical officer becomes expert at spotting the stooped backs which bend from the pelvis and the various grotesque limps that pass down the halls of the hospital. Hysterical leg weaknesses, hypesthesias and anesthesias following minor back injuries have become commonplace. We have been impressed with the large proportion of backaches, even those resulting from minor strains, which fail to improve with prolonged bed rest. The perpetuation of symptoms, in many instances, is undoubtedly dependent on the soldier's unconscious desire to become divorced from active military service.

Often the somatic fixation is not confined to the musculo-skeletal system and superimposed functional cardiovascular, gastro-intestinal or neurological complaints exist. In the vast majority of cases various psychoneurotic symptoms, such as anxiety, irritability, fatigue, insomnia, and mental depressions, are present. Most of us have learned to first evaluate the soldier and then his complaint. So often an anxious, strained or detached attitude has been a clue leading to recognition of the psychogenic nature of the ailment. Careful interrogation as to the exact qualities of the complaint is important. Frequently what is stated as pain, after questioning becomes a numbness or tingling, a dead or twitching sensation, a fleeting hot or sticking feeling, a fullness, or even a sensation of ice water dropping into the joint. Why soldiers so often develop somatic fixation in the musculo-skeletal system is an involved psychiatric problem. The fact that a strong back and healthy extremities are synonymous with good soldiering possibly make these portions of the body sites of predilection for somatic fixation.

CONCLUSION

Arthritis and related conditions comprise a large proportion of admissions to the medical service of an Army General Hospital. Certain clinical and administrative features relating to the rheumatism problem are peculiar to military service. These include the proclivity for involvement of the lower extremities in rheumatoid arthritis; the difficulty of differential diagnosis in early cases of acute and subacute peripheral arthritis; the often encountered uncertainty in the diagnosis of gonorrheal arthritis; and the frequent tendency for soldiers to develop psychogenic symptoms in the muscles and joints.

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ABDOMINAL TRAUMA*

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IN view of "total war," the subject of abdominal trauma is timely for civilian and military surgeons alike.

Abdominal injuries of whatever cause are always serious, and their treatment taxes the most mature judgment of the surgeon who must make a quick and flawless decision based upon the cause of the injury and the circumstances surrounding it, the condition of the patient with an accurate evaluation of the abdominal wound and associated injuries, the previous treatment given, the time elapsed since injury, and the probable success of surgical treatment.

Among the causes of injury may be a bullet, bomb or shell fragment, bayonet or knife, flying splinters of wood or other objects, falling masonry, structural steel, glass, splinters of bone from a fractured pelvis, injury from a rib, an injury incident to the use of motorized equipment, or a pressure air or water wave following detonation of a high explosive bomb. Determination of the circumstances surrounding the injury, for example, the position of the patient at the time of injury, may greatly help the surgeon in determining the course of the bullet or bomb fragment, or give some idea of the probable seriousness of the atmospheric or immersion blast injury.

SYMPTOMS AND SIGNS

In considering the patient's condition, if shock is not extreme the subjective complaints are determined, and a careful, quick physical examination made with an evaluation of any associated

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injuries. The symptom of pain varies greatly in these patients, and depends more upon the amount of intra-abdominal hemorrhage or "spillage" from the intestines than upon actual visceral trauma. A perforation of the large bowel, with little fluid in the lumen and the consequent small amount of peritoneal contamination, may not cause much pain; whereas a profuse hemorrhage or the leakage of acid gastric juice from the stomach will usually cause a great deal of pain. At times a localized area of pain away from the wound of entrance may indicate the area where the missile is lodged. Nausea or vomiting may or may not occur. In water-blast injuries, hematemesis and diarrhea with or without blood in the stools have been observed. Vesical or rectal tenesmus may occur following injury to the bladder or rectum. Dyspnea may occur, especially with abdominothoracic wounds, and actual air hunger may occur following considerable blood loss.

In consideration of the objective findings the pulse, temperature, respirations, blood pressure, color, and mental state are important. Inspection of the abdomen may show a diminution or absence of the normal respiratory abdominal excursion which suggests intraperitoneal extension of the wound, or if no wound is present locally or in an adjacent area it may indicate intraperitoneal damage from blast or from a direct or indirect blunt force. Bulging of the flanks may indicate intra-abdominal hemorrhage or spilling of the intestinal contents, and rarely a bluish discoloration may be observed around the umbilicus (Cullen's sign) which indicates intra-abdominal hemorrhage. If external evidence of injury is present, the tract must be examined, its probable course carefully plotted with an evaluation as to whether intra-abdominal penetration has occurred and, if so, what structures are probably involved, and whether a surgical repair and functional restoration can be accomplished. It is important to be cognizant of the possibility of a ruptured bowel even in the presence of an entirely extraperitoneal wound.

In the case of a bullet wound, the wound of entrance is generally smaller and less irregular than the wound of exit. If a concentric area of discoloration is present around the wound of entrance, it usually indicates that the bullet has taken a straight course; whereas an area of contusion to the right of the wound indicates that the bullet passed from right to left, and vice versa. At times some information can be gained by palpation in determining the probable course of the bullet, and occasionally the missile may be located lodged in the subcutaneous tissues of the abdomen, lower thoracic wall, back, buttock, or upper regions of the thigh.

Abdominal tenderness and rigidity give the surgeon a great deal of information. Generalized tenderness and rigidity usually indicate massive hemorrhage or abundant contamination of the peritoneal cavity with liquid intestinal contents; whereas localized tenderness and rigidity usually indicate that no serious hemorrhage has taken place, and that if intestinal perforation has occurred, the contamination has been slight. From the recent literature there appears to be an exception to this rule in some cases of immersion blast where generalized tenderness and rigidity have been present and have been accounted for on the basis of miliary subserosal, and mucosal intestinal hemorrhages. It is the opinion of some authors that the irritation of the serosa produces the peritoneal signs. However, cases of perforation or tear of the colon and terminal ileum have also been reported from this type of injury, and it would appear that the differential diagnosis between a nonperforated and a perforated condition is extremely difficult.

At times ballottement or percussion is helpful in determining the presence of fluid in the abdominal cavity. Intestinal activity is usually affected as a result of insult, and peristalsis will not generally be heard if hemorrhage or contamination of the peritoneum with intestinal contents is widespread. A rectal examination should always be made and the withdrawn finger cot observed for evidence of blood, and every case requires a gross examination of the urine for blood.

INDICATIONS CONCERNING TREATMENT

With this information the surgeon has had an opportunity to appraise the patient, and with the knowledge of the previous treatment given and the time elapsed since injury, he must decide immediately upon the course of treatment. Surgical treatment should be confined to those patients who, having responded from shock or hemorrhage, are of short duration, and whose condition appears amenable. An abdominal injury of long duration or of such wide extent as to make surgical intervention obviously futile should be given conservative care.

Generally speaking, it is never wise to operate upon a patient if more than twelve hours have elapsed since the injury. By that time walling off of the perforations by omentum, or adjacent loops of intestine has occurred, and surgery is practically always fatal; whereas by conservative treatment an occasional patient will survive usually after the drainage of one or more residual abscesses. An exception is in the case of certain penetrating and perforating wounds, or wounds from blunt force, which involve the liver, or, rarely a small perforating wound of the spleen. If it can be determined that a hollow viscus has not been perforated, the surgeon may be justified, depending upon the circumstances, in being conservative if he has seen the patient early. However, if bleeding continues, or he sees the patient late and there has been evidence of massive hemorrhage, late operation is relatively safe in the absence of a perforated viscus. It is well to remember, in splenic injuries, that there may be a period of "symptomatic silence," between the time of injury and the later appearance of hemorrhage, which may last for a few hours, several days or, rarely, for weeks.

The treatment of shock with blood, blood derivatives, electrolytes and oxygen is necessary in the majority of cases of abdominal trauma. Except in an occasional case where the findings point to the

shock being due to a massive hemorrhage the surgery should be delayed until the blood pressure is at least 80 mm. of mercury and the patient is showing some improvement. Relief of pain with morphine to allow rest, the head-down position, and the preservation of body heat are all important adjuncts. It is important, as demonstrated by the recent experimental work of Wakim and Gatch, to merely create an external temperature approximating that of the normal body. These authors have shown experimentally that cold, or heat above the normal body temperature, proved to be harmful to the life of animals in shock.

In warfare it very frequently is not practical to perform any but the most necessary laboratory procedures. Of the various procedures the most valuable one in most cases is a flat x-ray plate of the abdomen which can be done very easily and quickly with the portable field unit. In penetrating wounds this will give the surgeon a great deal of information. If conditions permit, appropriate hematological studies can be carried out, the most valuable one in the presence of shock being the hematocrit determination of mean corpuscular volume.

In the military service all soldiers are actively immunized against tetanus, and in a case receiving external wounds a stimulating dose of the toxoid is given. In cases that have not been actively immunized, 1,500 to 3,000 units of tetanus antitoxin should be used and repeated at weekly intervals for two or three weeks if the circumstances indicate it. Furthermore, in certain badly lacerated wounds polyvalent gas bacillus antitoxin is indicated.

SURGICAL INTERVENTION

Surgical intervention in these desperately ill patients requires the utmost in skill, judgment, and teamwork, and it is never advisable to keep these patients on the operating table more than one hour. The choice of the anesthetic has a very important bearing on the outcome and, although many problems of anesthesia in the seriously wounded must still be answered, ether remains the best and safest, single, all-around anesthetic agent in the average case of abdominal trauma requiring surgery. Under certain practical conditions local field block, supplemented by nitrous oxide and oxygen, or cyclopropane, can be used to advantage. In a rare case, and again under certain conditions, cyclopropane or ethylene might be used when the quality of rapid induction of the anesthetic agent is necessary to investigate without delay the question of internal hemorrhage or perforation. Spinal anesthesia or basal anesthesia with the intravenous barbiturates has no place in the surgical treatment of these patients who are susceptible to shock.

The *type of incision* should depend upon the probable intra-abdominal structures that are injured and, if practical, should not be made through the traumatized tissues. The incision should be entirely adequate in length, and if no special indications present themselves a paramedian or midline incision is generally preferable. If indicated, the incision may be oblique, transverse, subcostal or costal with excision of the costal arch, or in the loin to expose posterolateral wounds of the abdomen.

If, on opening the abdominal cavity, *hemorrhage* is encountered, it must be controlled to prevent further shock and to eliminate interference with any other operative procedures necessary. Splenic tears always require splenectomy and, if necessary, the pedicle can be digitally compressed temporarily. Bleeding from lacerations of the liver may usually be temporarily controlled by warm, moist packs, or, if not, the hepatic artery and portal vein can be compressed digitally near the free edge of the gastrohepatic omentum. With a small wound of the liver a piece of muscle placed over it will often suffice. With larger tears mattress sutures wide of the tear, and not tied too tightly, may prove satisfactory, although packing with plain gauze may be necessary. At times the liver may be too extensively ruptured or torn for repair. Bleeding from a superior mesenteric vessel may be controlled temporarily by digital pressure of the mesenteric vessels just below the duodenum. According to Storck, bleeding from the inferior vena cava has been successfully controlled by suture, or by forceps applied to the rent and left in position for several days. If ligation of the common or external iliac artery is necessary, Storck advises injection of the lumbar sympathetic ganglia with one injection of 95 per cent alcohol, or repeated injections of one per cent procaine to try to avert gangrene of the extremity. Extensive retroperitoneal hemorrhage may be due to a kidney injury, and one should not hesitate to explore the kidney and ureter by the transperitoneal route. Nephrectomy can be performed and, if necessary, clamps may be left on the renal vessels for several days.

If indicated by the type of injury, and after any significant hemorrhage that may have existed has been controlled, the *intestinal tract is examined systematically*. The entire colon is examined first because of the nature of any contamination from this organ. Any damage is repaired before going on with the exploration, and it is important to watch for perforations on the posterior wall, as they can be easily overlooked. The ascending and descending colon normally possess no mesentery, and if a wound is suspected involving the posterior wall the segment must be mobilized. Beginning at the ileocecal valve the small intestine and its mesentery are then carefully examined and any injuries repaired as they are discovered. A hematoma at the junction of the mesentery and intestine must be carefully examined for a perforation. Following this the duodenum, anterior and posterior wall of the stomach, pancreas, biliary tract, liver, spleen, diaphragm, bladder and retroperitoneal structures are examined as indicated.

Complete division of the large bowel is less frequent than in the small bowel, due to its size, but large tears are more frequent. Also, because of the lack of numerous coils, except in a case with a redundant pelvic colon, wounds of the colon are less apt to be multiple than in the small bowel.

Perforations of any part of the gastro-intestinal tract should, if possible, be cared for by suture rather than resection, due to the almost prohibitive risk. However, at times, due to extensive damage or an interruption in the blood supply, resection is necessary. If resection of the colon is indicated, an obstructive type of resection, which is a graded procedure and simply performed, is the safest. This may be supplemented in some cases by cecostomy. If the patient's condition necessitates it, the damaged loop may merely be exteriorized, as is practiced in doing the first stage of the Mikulicz resection for carcinoma of the colon. A resection with anastomosis should never be done. Colostomy is indicated only in very extensive wounds which are, however, amenable to suturing, and also in the case of rectal wounds. Drainage should be the procedure of choice following care of wounds of the colon.

In the small intestine very small wounds can be closed by purse-string suture, whereas in larger wounds the closure should be transverse to the long axis to avoid narrowing of the lumen unless it causes angulation. If resection is obligatory, end-to-end anastomosis is usually the procedure of choice, although a side-to-side anastomosis is quite satisfactory. Occasionally, in the presence of severe shock it is best to adopt the method used in treating colon wounds that require resection, by merely exteriorizing the damaged loop or performing an obstructive type of resection. A short circuiting operation, such as a transverse ileocolostomy, would conceivably be indicated in certain rare instances.

In *wounds of the stomach* the posterior surface must always be examined, and this is best accomplished by opening the gastrocolic or gastrohepatic omentum. In the case of an extensive gastric or duodenal wound, gastro-enterostomy might be unavoidable, or it might be necessary to perform a jejunostomy for feeding. Pancreatic wounds are generally associated with other injuries, and there is very little that can be accomplished by direct treatment. The paucity of these wounds seen by the surgeon is undoubtedly due to the relationship of the gland to the large blood vessels. Gall-bladder and common-duct injuries are treated by cholecystostomy, choledochostomy or, rarely, by cholecystectomy, as the indications present themselves. Wounds of the ureter are rare, but the general surgeon frequently sees bladder tears that are treated by suture and an indwelling catheter, or suprapubic cystostomy, as indicated. Wounds of the diaphragm and thorax frequently accompany abdominal trauma. Diaphragmatic lacerations are often most difficult to approach and repair in the course of an emergency abdominal operation and, unless dangerous to the patient, should be left for an elective procedure to be performed at a later date. If emergency repair is necessary, the transpleural approach is more satisfactory in most instances.

Before closure of the abdomen it is essential to use one of the sulfonamide drugs intraperitoneally, and evidence is rapidly accumulating to show that for this purpose sulfathiazole is superior to the older, more widely used sulfanilamide. Neither drug produces evidence of peritoneal irritation; whereas sulfapyridine, and to a lesser extent sulfadiazine, are definite peritoneal irritants and should not be considered. Sulfathiazole, from the standpoint of its antibacterial activity, is "polyvalent," and does not disappear from the peritoneal fluid for as long as four or five days after use. Because of this last quality it is not necessary to use oral or parenteral sulfonamide therapy for the first three or four days after surgery. In contrast, sulfanilamide is considered "monovalent" from the standpoint of its antibacterial activity, and disappears from the peritoneal fluid in less than twenty-four hours. This makes it necessary to start oral or parenteral sulfonamide therapy, if it is considered necessary, within twenty-four hours after surgery. Up to 10 grams of sulfathiazole can be used intraperitoneally, and it must be in the powdered or crystalline form. It is also important that it be dispersed over the surfaces rather than packed into one or two pockets.

In view of the general serious character of these cases and the possibility of disruption, *closure of the exploratory wound*, using through and through steel alloy sutures, is the procedure of choice. The wounds of entrance and of exit are thoroughly debrided, powdered lightly with sulfathiazole, and vaseline gauze inserted. Any intraperitoneal drains or packs are brought out through stab wounds or through the traumatic wound if present.

POSTOPERATIVE CARE

Good postoperative care is paramount and a few important points are worth consideration. Blood and blood substitutes must be used freely to combat shock, anemia and hypoproteinemia and the electrolytes, to maintain a sodium chloride balance and a fluid intake of at least 3,000 cubic centimeters in each twenty-four hours. One hundred per cent oxygen given by the mask method is effective as an adjunct in shock therapy, and also for removing nitrogen from the lumen of the distended intestine in ileus, which is so frequently a complication following abdominal trauma. It should be routine treatment to use a gastroduodenal catheter in these cases for prevention and treatment of ileus, and, if necessary, a Miller-Abbott tube. Even in the absence of special indications for sulfonamide therapy, it seems advisable in cases of wounds that have perforated the peritoneum, or wounds of the gastro-intestinal tract, to continue its administration for seven days postoperatively. If given orally, sulfathiazole or sulfadiazine seems preferable; whereas if given intravenously, sodium sulfadiazine appears to be the drug of choice, although sodium sulfathiazole has proven quite satisfactory. In conjunction with sulfonamide therapy it must be remembered that frequent blood levels, blood counts, and urinalyses should be done if practical. The urinary output should be a minimum of 1,000 cubic centimeters daily. The rôle of vitamins, particularly the vitamin B complex group and vita-

min C, makes their administration important in the care of these postoperative patients.

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DIABETES MELLITUS: SOME OF THE NEWER FACTORS IN ITS ETIOLOGY AND TREATMENT *

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INTRODUCTION.—Most investigators agree that a blood sugar which is too high causes existing diabetes to become progressively worse.

An unduly elevated blood sugar after meals may be the precipitating cause of diabetes in those who are already predisposed to this disorder. More important still, from a statistical viewpoint, the abnormally high blood sugar caused by overeating may have been the most important factor in the development of this disorder in the very large group of obese diabetic patients. If these statements prove to be true, then the objectives, both in the prevention and treatment of diabetes, are simplified.

Experimental work in support of the idea that a blood sugar which is too high may be the most important factor in the causation of diabetes in animals:

Allen's work [1,2] deserves first consideration. He showed that, following radical partial pancreatectomy in a dog, there were no signs or symptoms of diabetes until overfeeding abnormally elevated the blood sugar, resulting in the overstimulation and fatigue of the remaining island tissue. This overstimulation resulted in hydropic degeneration of the beta cells. Starvation of the dog resulted in the lowering of the blood sugar and a recovery of the beta cells of the islands of Langerhans if the overfeeding had not been carried on too long. Copp and Barclay [3] found that in similarly partially depancreatized dogs insulin therapy, which lowered the blood sugar to normal, brought about the same favorable results without starvation.

The second method of producing diabetes in intact animals is the daily injection of a watery extract of the anterior pituitary gland. This work was done in widely separated centers by Evans,[4] Houssay,[5] Young,[6] and Best.[7] The principal lesion in the pancreas is that of a very rapid degeneration of the beta cells in the islands of Langerhans, similar to that observed by Allen. If the injections are not continued too long, then a spontaneous recovery occurs when the injections are stopped. If the injections are continued long enough, then the diabetes is permanent.

Best, Campbell, and Haist have shown that the injection of this pituitary extract is associated with an increase of the blood sugar, probably due to the effect of the extract on the liver and other cells in the body. They showed that the simultaneous injection of insulin prevented the degenerative changes in the islands. They believe that the overstimulation and subsequent fatigue of the island cells are due to the high blood sugar or to those factors instrumental in the regulation of the blood sugar, incident to the injection of the pituitary extract, and not to the direct effect of the pituitary extract on the island cells.

Best and Haist,[8,9] studying the actual insulin content of the pancreas in rats, have shown that it varied remarkably with the type of diet used. Starvation and low calorie diets reduced the insulin content of the pancreas, diets composed mostly of fat did likewise, but both high carbohydrate and high protein diets increased it. Insulin, when used with starvation, low calorie diets, or high fat diets, further reduced the insulin content of the pancreas, and when used with high carbohydrate or high protein diets prevented an increase in insulin. The procedures, therefore, which generally lower the blood sugar, such as starvation, low calorie diets, high fat diets, and insulin, reduce the insulin content of the pancreas. Whether this decreased

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